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Feature Story

Each month we provide a feature article on key industry trends and developments. Authored by a member of Intel's executive staff, the feature offers insightful information for product development, planning and execution.

Inside Looking In

Senior Technical Marketing Manager for Platform Technologies Tim Mostad gives you a fresh perspective on the latest technologies making their way onto Intel Architecture platforms. Tim lets you see the work through the eyes of the people making it happen and lets you hear what they really think. It's straight talk from developers to developers.

Pentium® III Processor Platform Series

The Pentium® III Processor Platform Series will bring you focused articles on the hottest technologies for Pentium III processor-based platforms. From Rambus memory technology to optimizing software, it's news and information you can use right now.

Top Stories

Delivering in-depth reports on key platforms, products and technologies, our Top Stories provide a monthly source of information on issues affecting developers. Be sure to check in every month for the latest developments driving the evolution of the industry.

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On behalf of all of us at Platform Solutions, welcome to the future of the PC platform!

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Feature

Intel® Platform Solutions for Applied Computing

By Thomas R. Franz
Vice President, Computing Enhancement Group
and General Manager, Embedded Microcomputer Division
Intel Corporation

Developers of applied computing applications are discovering that Intel technologies and platform building blocks meet their requirements for innovative, fast time-to-market designs. Hear what the engineers are saying.

You've heard that the explosive growth of the Internet is changing computing. In fact, last month's Platform Solutions feature article was titled *The Internet: Driving Change and Opportunity in Applied Computing*. It details the emergence of high-performance, connected systems designed for dedicated applications.

In this overview, we will look at some embedded Intel® Architecture-based applications in the applied computing segments and see how developers are using Intel® Platform Solutions to meet their customer requirements. We will also see how Intel is joining forces with leading companies to launch a new program, the Intel® Applied Computing Platform Providers.

Intel Platform Solutions

To help developers develop innovative, differentiated products in less time, Intel is delivering platform solutions for market segments that are a natural outgrowth of Internet computing. Intel platform solutions for applied computing rest on the solid foundation of Intel's PC technology leadership and include hardware and software building blocks, tools and design support specifically aimed at the requirements of applied computing.

Let's look at some examples, and hear what the developers themselves have to say about the benefits of Intel platform solutions.

Technologies and Initiatives

Trademart Technologies selected the Intel® Pentium® II processor–Low Power Module for their next-generation transaction terminal, not only for the processing performance but also for the added value Intel® technologies create for their customers.

Key Intel-based technologies in this design include Wired for Management 2.0, Instantly Available PC technology, power management based on the Advanced Configuration and Power Interface (ACPI) specification, USB connectivity, and the ability to easily upgrade system BIOS and embedded control code stored in flash memory.

Trademart Technologies chief design engineer Bruce Anthony comments, "The need for manageability, for example, required us to look 'outside the box' to envision new ways to manage resources, do maintenance and handle status reporting. This kind of thinking influences how the platform components are selected and used. Intel technologies are coming together to enable companies like ours to implement new designs."

Building Blocks

Computing Devices Canada (CDC) and NetScout Systems turned to Intel for platform building blocks and a strong processor roadmap.

CDC's applied computing application is an industrial PC used for military command and control systems. According to Jackson Ho, CDC's program manager for the Advanced Computer Electronics Group, "Command and control applications impose very high-end processing requirements. The increasing performance of the Intel® Architecture drives our design process. Our customer base has very wide-ranging requirements, and the Intel Architecture-based platform is the only architecture that can support them all."

NetScout Systems applied computing application is the Intelligent Network Probe*, which is a family of network monitoring devices. According to NetScout vice president of Manufacturing Terry Steele, "NetScout probes are designed to last as long as the customer stays with the network, so product life cycles are usually quite long. Intel's embedded product roadmap gives us the ability to match the processor to the customer's price/performance requirements. We get the best of both worlds—the performance curve of the Intel roadmap, with longevity."

Tools and Support

Intel platform solutions for applied computing are backed by a rich development environment, including software, tools, and information resources for developers. Trademart Technologies, for example, used Intel's VTune™ tool for application optimization in addition to technical information available from Intel Architecture Labs. CDC relies on a wide variety of development tools for the Intel Architecture, including software compilers for multiple operating system environments.

Intel® Applied Computing Platform Providers

Designers of applied computing products know that Intel Architecture platform can help dramatically shrink time-to-market and simplify the hardware validation process. Intel is proud to launch a new program called Intel Applied Computing Platform Providers (IACPP). The program provides developers with a source for leading edge Intel Architecture board-level products and systems that are available for an embedded life cycle.

The IACPP is a licensed program of third-party vendors who meet Intel's criteria for quality assurance, manufacturing capacity, design capability, tools, and support. The program was just launched on May 19, with vendors providing world wide coverage. The initial nine vendors are Advantech, Force Computers, Motorola Computer Group, Portwell, RadiSys Corporation, Teknor Industrial Computers, Texas Micro, Trenton Technologies, and Ziatech Corporation. You will find more information about the program and the participants at the Platform Solutions for Applied Computing [Web site](#).

Working with IACPP helps developers move their Intel Architecture applied computing products through the hardware design process in the shortest time.

Value and Product Differentiation

Intel platform solutions and the IACPP's are helping developers of a diverse range of products shorten time-to-market and meet customer requirements for powerful and scalable applied computing products. Intel is helping developers focus their technical resources where it matters most—on adding value and differentiation that can contribute to competitive advantages in today's applied computing market segments.

For More Information

Intel provides reference configurations and an extensive roadmap of components for a wide variety of applied computing applications. You will find the details on Intel's new [Platform Solutions for Applied Computing](#) Web site.

About the Author

Thomas R. Franz is a vice president of the Computing Enhancement Group and general manager of the Embedded Microcomputer Division (EMD) at Intel Corporation. EMD products include embedded Intel Architecture processors and other products used in a variety of applied computing applications, including telecommunications and networking devices, retail and point-of-sale transaction terminals, ATMs, and industrial PCs.

Inside Looking In

Lead, Follow, or Get Out of the Way

By Tim Mostad
Senior Technical
Marketing Manager
Intel Corporation

The Internet is a hot topic with stock analysts, but becoming an Internet company takes more than merely talking the talk. It requires leadership. Is your company ready? More importantly, are you?

So you want your company to become an Internet company? Who wouldn't? Look at the price to earnings ratio (P/E) of your favorite example. Folks who hold shares of a "normal" company could see their worth triple or more if that company could just harness the potent Internet descriptor.

In light of the potential payoff, Intel's executives recently declared at an internal marketing conference that Intel would be "reborn on the net." While it remains to be seen that a stock will be rewarded for any company's Internet renaissance, there doesn't seem to be a lot of downside in making the transition, especially if reasonable core business can be maintained. Such is Intel's challenge. And maybe your company's too?

Of course, it takes more than words to make such a significant change happen. It takes resources, risk, and resolve. You have to put people and money on projects that may not pay off, and keep them there long enough to find out. After all, risk is the essence of the Internet. The companies with the big P/Es make little money or even lose some but, oh, is the promise there!

Just what does this have to do with you, the developer of products for the electronics market? The answer depends upon how you see your role. Les Brown, the popular motivational speaker once said, "You can lead, follow, or get out of the way." I believe we all have at least these three choices. Maybe not so coincidentally, this saying also became popular on Big Dog brand T-shirts. Are you prepared to do what it takes to become the Internet "big dog" in your company?

In the past year, I've chosen to make a significant change and get back to a family core business. My grandfather was a farmer so I purchased a few acres to do some hobby farming. Consequently, I've been using the Web to search for a tractor to work my farm and to gain a basic farm machinery education. There's a growing debate on the farm forums involving a revolution that threatens livelihood of tractor dealers. The Web now enables feature comparisons and comparative shopping, which enables price competition, a novelty for mom and pop dealers who are used to deciding the sales margins they want to make. One or two perceptive dealers actually seem to understand, and they're poised to take advantage, but most are merely frustrated.

One astute contributor suggested that we all should agree to just support our local dealer and quit causing them so much grief—to vote with our money. This is a good example of a get out of the way strategy. If you and your company agree that the Web is an unnecessarily disruptive and annoying complication to your comfortable lives, then you've adopted this strategy. You might advise your marketing department to spend their soon-to-be-dwindling advertising budget on handbills and post them at the local seed and feed store. You're bound to find at least a few customers there who appreciate your philosophy.

In the electronics business, we really have only two choices: lead or follow. If your reaction to an Internet rebirth announcement is to wait to see what your manager tells you to do or to see if the PR department can successfully spin your latest technology to make it relevant, then you're executing a follow strategy. This does not necessarily mean failure or defeat, but it does mean that others will be in front. The other day I saw a bumper sticker that said, "If you are not the lead dog, the scenery never changes." That about sums up my enthusiasm for following.

The challenge, then, is to become a leader. The challenge is to see the Internet as a necessary complication. The challenge is to build your job around the Internet even if you don't have to.

My staff recently devoted a day to this very purpose. We agreed to adopt a "why not on the Web" strategy to challenge one another when we try to find reasons to do something the old fashioned way. Initially this rigor will slow us down, but we are investing. We'll put status reports on the Intranet. We'll conduct more than one staff meeting via teleconferencing on the Web, regardless of the fact that we all sit within 30 feet of one another. Each Technical Marketing Engineer will be responsible for putting up his own Web page and keeping it updated. Collectively we'll learn the strengths and weaknesses, the goods, bads, and uglies. I want my group to be the group that consistently has the Internet facts at the right times and gains the reputation as the folks who know the Web. It's tough for me to believe that an entire company can be reborn on the Web unless this attitude becomes common. Let us be the ones who start it.

You could reasonably counter-argue that this advice is a few years late and that trying to be reborn as a net company is a silly idea. As for the first part, how many groups that you know use the Web to the extent I describe? If the idea is old, then these ideas should be ho-hum, yet I know of no other group at Intel or any other company that makes the Internet its way of life. Even if such groups do exist, there's still plenty of opportunity to lead.

As for Intel becoming an Internet company, analysts are not especially optimistic. I suspect that anyone who underestimates the way the Web will change the market has a real opportunity to be surprised.

Back in 1980, when I joined Intel, it was difficult to explain even to technical people what a microprocessor was, let alone what Intel did. Today, I'd wager that most literate folks know that a chip is a component of a PC even if they still have no idea what one does. Even the most reluctant farmers will eventually find that the Internet has become a component of their lives, marching in like the local high school band in the harvest parade.

It remains to be seen whether you and your company will be leading, following, or watching the parade pass you by. I, however, want to be at the wheel of that gargantuan tractor, the one that drives in front of the parade and moves all the bystanders out of the way. If the rest of the company also executes, this machine will be painted Intel blue and towing an extra large stock trailer behind it.

About the Author

Tim Mostad says, "the majority of my 18 years at Intel have been spent in the pursuit of technical marketing nirvana." He is responsible for demos, white papers, plugfests, and technical training to support the adoption of new desktop technologies.

Focus

Building a Solid Foundation for IA-64 Server Solutions with Early Adopter Membership in the DIG64 Industry Group

By Michael J. Demshki
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Intel Corporation

An Early Adopter membership in the DIG64 industry group gives you a head-start in the development of IA-64 processor-based products that are compatible "out-the-door."

When a new computing platform is on the way, the greater a head start a developer can get the better. The DIG64 (Developers' Interface Guide for IA-64 Servers) Industry Group is offering just that opportunity with Early Adopter membership. Through DIG64, Intel is working with leading server hardware manufacturers, OS vendors, BIOS vendors, and peripheral manufacturers to make sure developers get the information they need to design IA-64 processor-based products that are compatible out the door.

What is the DIG64?

Intel and leading vendors have joined forces to create the DIG64, an operating-system-independent reference guide that establishes basic system building blocks, interfaces, and programming conventions between IA-64 servers and system-level software such as the operating system and device drivers for IA-64. The DIG64 specification will eliminate historical problems with new platform development and incompatibilities by providing a common design specification with testable, interoperable interfaces. DIG64 compliant products will be valued by IT departments because they will reduce the qualification cycles and total cost of ownership (TCO) of these products through increased levels of compatibility and interoperability.

The DIG64 specification will help vendors reduce time-to-market and enable concurrent development by:

- Establishing common building blocks that promote compatibility & interoperability between software solutions and the hardware.
- Defining how to implement existing standards and specifications for optimum system configuration that maximizes the benefits of the IA-64 architecture.
- Providing industry agreement and common schedules for migrating costly legacy technologies from these new platforms.
- Knowing which interfaces will be defined by the specification, so your products can be promoted as compliant systems that offer reduced qualification needs/benefits for IT.
- Membership as an Early Adopter allows early access to the specification as it is being developed, so you can start on your designs now and be able to take advantage of the promotions available at Merced launch.

DIG64 Specification Overview

DIG64 specification is a comprehensive system design guideline, defining a common set of baseline IA-64 system building blocks and related firmware, operating system, and software interfaces. This guide does not address platform implementation, physical packaging, form factors or environmental design. The following topics are covered in detail in the guide:

- **Core Components**—describes the hardware, firmware/BIOS, software elements, and interfaces between them. Partitioning and packaging are not discussed. Chipset functionality between the processor, memory, and I/O bus structures are defined, in addition to recommended ACPI2 usage.
- **Firmware Services**—describes the usage and positions of specifications that define IA-64 firmware services. This information will be key for legacy migration management and integration of ACPI2 usage.
- **Networking and Communications**—defines basic feature requirements for network adapters and other communications hardware. This includes network adapters, modem, ATM, ADSL, cable modem, ISDN, and Irda requirements. This section will provide common interpretations for usage of technical references such as: IEEE1, IEEE2, NPSD1, and others.
- **Storage Guidelines**—defines guidelines and limited set of requirements for I/O adapters/controllers and storage devices used with IA-64 based servers. Goal is to provide guidelines to enable I/O subsystems that yield high reliability, serviceability, performance and availability. Storage component design features and capabilities are covered for high-performance systems, including PCI and ACPI2 usage models.
- **System Management**—focuses low-level monitoring, error detection, and alerting or reporting. Issues of system data access, redundancy, sensor usage, etc., are described to optimize reliability, serviceability, and availability.
- **I/O Attachment Guidelines**—defines specific requirements for buses and devices, including design features in I/O components. Covers areas of legacy technology migration, driver tuning, and physical address space and bus mechanism requirements.
- **Technology Migration**—describes a path for removal of legacy items for a clean architecture break with IA-64 server systems. Specific focus for providing a schedule designed to keep suppliers of hardware, firmware, BIOS, and operating systems in step. As many older technologies have extended/existed beyond their value, this topic will provide system designers good guidelines to maximize advantages of new technologies and free up costs of legacy support.

Getting Involved as a DIG64 Early Adopter

Gaining access to the DIG Specification as an Early Adopter represents one of the earliest ways companies can become involved to optimize product development resources, reduce design rework, and lower development costs for IA-64 server systems. In addition, as an Early Adopter member, your company can participate in the promotion of compliant products that coincide with the Merced launch.

For More Information

Membership is free of charge. To find more information about becoming a member, visit the DIG64 Early Adopter [Web site](#).

About the Author

Michael Demshki is product marketing manager for Intel's Server Industry Marketing. In his current position, he is responsible for developing and managing server industry efforts for Intel and for coordinating the marketing of these efforts across Intel divisions. Previously, he was product line manager in Intel's System Management Division. He worked in the high-end server market segment for over 8 years prior to joining Intel and has held various positions in engineering, marketing, and management over the last 17 years. Michael Demshki completed high-tech management post-graduate work at Stanford University in 1994, received an M.S. in Software Engineering in 1982 from Wang Institute of Graduate Studies, and a B.S. in 1979 from Colorado State University.

Pentium® III Processor Platform Series

This new column provides the latest information on platform technologies arriving with the Intel® Pentium® III processor.

Intel® Pentium® III Processor: The Ultimate Platform for the Web

By Carl Johnson
Online Tools Program Manager
Intel Content Group
Intel Corporation

No matter how important your message, your competitor's Web site is always just a click away. Attracting and holding the eyes of site visitors is easier with visually rich content that engages the power of the Pentium® III processor. See for yourself.

One of the most ironic aspects of the Internet is that this potentially active, extensible medium is still dominated by static and flat HTML content. Today's Pentium® III processor-based PCs have the processing horsepower to deliver rewarding and rich experiences to end users via the Internet, whatever the speed of their connection.

Internet content providers face a tremendous challenge. No matter how important your message, products, or online content, your competitor's Web site is always just a click away. Attracting and holding the eyes of site visitors is crucial. This can now be readily accomplished through the development of visually rich content that engages the power of the Pentium III processor streaming SIMD extensions to differentiate your Web site.

Intel is investing heavily to promote the widespread adoption of plug-ins that enable PC users to experience new content with their Pentium III processor-equipped PCs. At the same time, Intel is helping to provide the software industry with a tremendous breadth of tools that enable the creation of cutting-edge content for the Pentium III processor.

Today's Web Is Flat

The Web should be a cool and visually rich information environment. Instead, it's dominated by static, text-based content. Many Web developers have deliberately shied away from rich Web content for a variety of reasons having to do with software. They've been naturally reluctant to build content that requires plug-in software, for fear of excluding potential audience. In fact, installation and maintenance of some early versions of Internet software has been difficult for average "non-techie" PC users.

The result is that plug-in software that would enable users to experience rich Internet content is not widely deployed on PCs. As a consequence, available new technology that could be used to enrich Web sites is not widely used by audience-conscious Web designers.

On the flip side, PC users don't feel motivated to download and install the software, since there's no compelling content that makes it worthwhile to go through the painful installation process. It's the classic chicken-and-egg conundrum.

Resolving the Impasse

Even with today's current POTS (plain old telephone service) connections, a Pentium III processor with Streaming SIMD (single-instruction multiple-data) extensions is dramatically more effective in handling compression, streaming video, audio and full-screen 3D graphics to provide a rewarding Web experience.

To resolve the content creation impasse, Intel is optimizing and diffusing cutting-edge Internet software directly to end users as well as engaging with leading sites on the Web to push the envelope of content quality.

The Intel Online Tools Program

Intel's Online Tools program is working to accelerate the broad adoption of advanced Internet content in three ways:

- *Helping content developers use rich content* to differentiate their sites by engaging with leading Web sites all over the world to create cool content. Intel's content creation effort includes MetaFlash™ 3D Camera, content security and asset management, content libraries and template applications. Technology matchmaking involves engaging leading tools ISVs with Web agencies, sites and developers. Web developers receive access to a complete set of online tools and optimized runtimes. Intel also provides developers with access to demos, tips and tricks, technical whitepapers and Web Developer Conferences.
- *Providing engineering resources* to Internet software companies to help them take advantage of the power of the Pentium III platform to dramatically improve software performance.
- *Making required software plug-ins easy* for end users to get and maintain. Software optimized for the Pentium III processor is now being delivered directly to users through the Intel® WebOutfitterSM service. Plug-in segments include: interactive 3D graphics, streaming media, audio and music, imaging and graphics, character animation, and operating system-level media layers and APIs.

See and Hear Pentium® III Processor-Optimized Content

Web software optimized for the Pentium III processor is now arriving:

- Macromedia* has announced that users of PCs with the Pentium III processor will have access to optimized versions of its Shockwave 7* and Flash* media players without special plug-ins or software. This approach will enable users to experience rich-content Web sites, animated interfaces, interactive demos, vector-based Web graphics and other high-quality content.
- Excite Extreme* is a concept Web site built to demonstrate 3D search and navigation. Optimized for the Pentium III processor, the site is built with Java* and was developed in a collaborative effort involving Excite*, Razorfish* and Intel.
- Beatnik Player* 2.0 and Beatnik Player Pro* 2.0 are Web audio players that engage the Pentium III processors Streaming SIMD Extensions and high floating point performance to create stereo imaging enhancement, including powerful reverb stereo expansion effects.

Intel's WebOutfitterSM Service

Intel's WebOutfitter service delivers leading edge content optimized for the Pentium III processor, plus tools and tutorials. Members can download plug-ins tuned for the Pentium III processor, from the WebOutfitter Web site, receive them via e-mail, or on the Intel WebOutfitter Tool Kit CD, which makes acquiring the plug-ins a simple one-step process. The WebOutfitter service is localized in 11 languages, it's available worldwide to millions of visitors, and it provides rich and rewarding Internet experiences "right out of the box."

Behind the scenes, one important key to the success of the WebOutfitter service is Intel's ongoing work with software developers to conduct front-end build-through testing and provide back-end support.

Attention, Web Content Developers: The Waiting Is Over

For content creators, the waiting is over. The availability of content creation tools and resources optimized for the Pentium III processor has removed the last remaining obstacles to the creation of compelling Web content to support high-traffic sites. Users equipped with Pentium III processor-based PCs can experience compelling and rich content, even with POTs telephone connections. With the growing availability of optimized software and tools, the Pentium III processor is the ultimate platform for the Web.

About the Author

Carl Johnson has been involved in the world of digital content creation for well over a decade. Carl co-founded Digital Artworks Inc., a west-coast production company that pioneered the use of PCs for broadcast quality 3D computer graphic animation. At Intel, Carl works with software and content companies all over the world to bring rich media to PCs on the Internet.

For More Information

Check out these advanced-content demos:

- [Styleclick](#)
- [3D Interactive Shopping](#)
- [WebOutfitterSM service](#)
- [3D VRML Browser](#)
- [Immersive 3D](#)
- [Streaming 3D Animation](#)
- [Dot Comix](#)
- [MTV](#)
- [3D Search](#)
- [Macromedia Flash/Shockwave](#)
- [Lexus](#)
- [IPIX](#)

Streaming Audio/Video

- [CNN.com](#)
- [Bloomberg.com](#)
- [CBS Sportsline](#)
- [Microsoft Webevents](#)

3D Inspect and Examine

- [Virtual Characters](#)
- [Interactive Music](#)

To see examples of consumer applications optimized for the Pentium III Processor, visit <http://www.adviceforpcs.com/showroom/index.asp>.

Top Stories

Policy-Based Management: The Drive for Open Standards

Dan Dahle
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Policy-Based Management can make a big difference in the deployment of new devices in enterprise network infrastructures. Intel is promoting standards and developing new technologies to make it happen.

Policy-Based Management (PBM) can make a significant difference in the deployment of new devices and capabilities in enterprise network infrastructures. Here's how Intel is promoting standards and developing technologies that lead to better PBM solutions.

As new technologies continue to emerge and influence the network infrastructure of today's enterprises, developers need to provide platform implementations that address the increasing need for network management solutions. One category of network management products that is rising to the forefront is policy-based management, which allows network administrators to map business policies to underlying network capabilities such as Quality of Service, security, and basic device configuration.

Without policy management, IT managers and administrators must manually configure and manipulate network elements through control line interfaces—a process that is both error-prone and time-consuming. This approach also leads to difficulties in making adjustments to network parameters, even if network usage patterns are fairly predictable over time. Given these complexities, dynamic network configuration based on usage requirements can only be achieved with some type of automated management system. And that's where policy-based network management can help.

A Need for Standards

Many network vendors have announced plans for or are beginning to ship policy-based management software for use with their networking products. But most of these solutions are proprietary and are focused on supporting that particular vendor's network infrastructure. As more and more customers are becoming aware of the benefits of PBM solutions, the demand is rising for standards-based product implementations designed to provide support for many different kinds of devices in today's increasingly multi-vendor networks in a way that accelerates the deployment of existing and new product capabilities.

Intel is taking action to help remedy the situation. Central to its efforts is the active participation of the Intel Architecture Labs (IAL) and the Network Communications Group in several standards bodies including the Internet Engineering Task Force (IETF) and Distributed Management Task Force (DMTF).

In the IETF, Intel is leading the Reservation Access Protocol (RAP) sub-committee, where the Common Open Policy Services (COPS) protocol is being written. And Intel is actively contributing to a number of DMTF standards efforts, including the Common Information Model (CIM) specification. While these activities relate directly to PBM, they also tie into such broader Intel initiatives such as Wired for Management (WfM) and the Internet Building Blocks Initiative.

Technology Development Underway

In addition, Intel is developing a robust technology that delivers on the promise of standards-based, broadly deployable policy-based management solutions. Along with providing PBM implementations capable of operating across mixed-vendor networks, Intel's Policy Services building block will lay the groundwork for delivering such additional future building blocks as network architecture and application platforms.

Hewlett-Packard's Network Management Division has already licensed a version of this technology and has announced plans to ship a more vendor-independent PBM solution later this year. This solution is expected to support several Intel Network Communications Group (NCG) products including Intel® Network Adapters.

For developers, the message is clear: to meet the demands of today's networked business enterprises policy-based management must be addressed in all hardware and software platform solutions moving forward. And to truly meet those demands, PBM must be based on standards. Only then can it provide broad support for the range of devices being used in today's multi-vendor, heterogeneous network infrastructures.

Future issues of Platform Solutions will continue to track the efforts of Intel and the industry to help achieve these goals and pave the way for broader and faster deployment of networking products, applications, and capabilities. Think of it as standards policy in a rapidly changing arena that can afford nothing less.

About the Author

Dan Dahle is the marketing director for the Intel Architecture Labs' Internet Building Blocks Initiative, and Bob Beard is the product line manager of Network Management and Software Platforms in Intel's NCG.

For More Information

For more information on Policy-Based Management and related Intel technologies, visit the [IAL Web site](#).

IPSec Security and the Corporate Enterprise

By Matthew Rollender
Strategic Marketing Manager
Network Interface Division
Intel Corporation

As e-commerce continues to proliferate, businesses are placing their intellectual capital on the Internet. Now there's a way to 'armor the network pipe' to provide application-transparent security for Internet transactions.

The growth of business-to-business commerce over the Internet has had revolutionary implications for global business and for the PC industry. In the Internet age, protecting intellectual capital has become paramount. Just as trust is one of the bases of the economy in the physical world, trust must exist in the cyber-world. Technologies and building blocks designed to provide a degree of trust are becoming a core component of the network infrastructure in 1999, with full deployment expected in 2000.

Intel is developing key technologies for both the network and the PC platform to help build trust into the network infrastructure. Implementing the IP Security Protocol (IPSec) in layer 3 in the protocol stack is an important piece of the equation. IPSec is an industry specification designed to “armor the network pipe” and help provide a consistent method for authentication and encryption via two modes—tunnel and transport. Because IPSec is designed to be transparent to all applications, it can be used in conjunction with application-layer security.

The Explosion of Internet Commerce

The Internet is growing at an explosive rate. Millions of people are getting connected, and they're doing business in the electronic world. IDC estimates there are now about 130 million users on the Internet, growing to over 350 million users by 2002 (IDC Internet Commerce Market Model*, 1998). Business-to-business electronic commerce now totals about \$100 billion per year, and the total is expected to grow to almost \$1 trillion by 2002 (*Forrester Research, 1998*).

As more business is being transacted, more critical and sensitive business data and more financial information and other forms of intellectual capital are going online. We're moving toward a single virtual network shared by millions of users, where electronic transactions occur regularly and where business is often done online without any afterthought for protection of intellectual capital.

Threat Follows Value

Just as in the physical world, threat follows value in the network world. Here are some revealing numbers from the FBI/CSI Computer Crime & Security Survey (1998):

- 78 percent of the companies polled revealed that insider abuse of network access had occurred within the past year.
- 45 percent reported unauthorized access by insiders.
- 24 percent reported unauthorized access by outsiders.
- 18 percent revealed theft of proprietary information, or intellectual capital.

Beyond the Firewall

The traditional answer to network security has been the firewall, a device that controls access to a corporation's network resources from the outside. The primary function of a firewall is to allow network access to authorized users and to keep unauthorized users out. The firewall does its job very well, but it's just a part of protecting corporate assets because increasing amounts of corporate data are being deliberately placed on the Internet, where firewalls offer no protection.

Moreover, as the FBI statistics show, there's a real threat to corporate intellectual capital from insiders within the perimeter.

The IPSec Standard

The answer to these issues is a standards-based technology called IPSec. Defined by the Internet Engineering Task Force (IETF), IPSec is a core technology that provides IP network-layer protection. It is intended to enable end-to-end encryption and authentication in both public and private networks for protected TCP/IP communications.

Since IPSec provides encryption at the network layer, applications do not need any modifications in order to take advantage of the capability. Encrypted IP packets look just like ordinary IP packets. As a result, they can traverse the Internet, extranet, and intranets just as easily and transparently as ordinary IP packets once the end station has been equipped with IPSec technology.

Intel supports the open IETF standard for IPSec. In fact, Intel is currently deploying IPSec technology in its Virtual Private Network (VPN) and remote access VPN products. Intel will continue to support the development of the standard and plans to enable additional key pieces of network equipment for trust and protection within corporate LANs, intranets, and the Internet.

The Benefits of IPSec

IPSec can help build a trusted virtual enterprise while helping to reduce the cost of:

- *Remote Access.* Remote users can access the corporate network over the Internet instead of dial-up lines. Accessing a local IP for connection and using IPSec for encryption can help significantly lower telephone charges and equipment costs.
- *Intranets/Branch Office Connectivity.* Large corporations can save money by eliminating the existing WAN infrastructure and significantly reduce telecommunications charges by using the Internet.
- *Extranets.* IPSec lets corporations create virtual, protected links through the Internet to customers, vendors, and other business partners.
- *Corporate LAN.* IPSec can provide trusted workgroups to help protect sensitive corporate data.

The Need for Network Security Management

Manageability of network security is important. It must be integrated into the company's overall security administration and network management policies.

In order to build trust in the network and help meet their customers' corporate manageability objectives, software developers should consider the potential value of making their applications security-aware. IPSec is an important building block.

Deployment of IPSec capabilities should begin to occur throughout the network infrastructure in 1999, and plans call for full deployment as an integral component of the network in 2000. If they wish to benefit from the technology, corporate IT departments should plan their own pilot deployments of this capability this year to manage this new building block technology in the network infrastructure.

Working together, the industry can make the trusted virtual enterprise a reality.

About the Author

Matthew Rollender leads a team in Intel's Network Adapter Division, which is responsible for strategic marketing and product planning for network adapter cards. His team is investigating new product requirements for Intel's network adapter product line and is working to drive protected LAN communications product deployment for the enterprise. This work supports Intel's initiative to make the trusted, connected PC the platform of choice for protected communications in intranet, extranet, and Internet networking environments.

For More Information

An [IPSec white paper](#) Acrobat file is available for download. To review the IPSec specification, visit the [ITEF](#) Web site.

Intel® Next-Generation StrongARM® Technology Delivers 750 MIPS at Ultra-Low Power

By Allen Hyman
Marketing Manager StrongARM® Product Line
StrongARM Bridges Division
Intel Corporation

By delivering 750 MIPS at less than 500 mW, Intel's next-generation StrongARM technology provides a quantum leap in performance, without tradeoffs in low-power capability. It sets the stage for an exciting new wave of Internet access products.

The Internet is becoming the centerpiece for the way we do business, today and in the future. Cell phones, palm computers, PC companions, pagers, and two-way messaging are already integrated into the fabric of our daily lives. In the near future we will become just as familiar with Internet access devices that transcend the current categories of "desktop" and "handheld." Users are already beginning to look for information appliances capable of supporting improved speech recognition, text-to-speech and handwriting recognition capabilities. They'll want these powerful features delivered in a multi-function package that also provides long battery life.

Intel® Next-Generation StrongARM® Processors

To help the industry meet these demanding requirements, Intel is introducing next-generation StrongARM® technology, representing a quantum leap in performance without tradeoffs in low-power capability. For comparison purposes, today's StrongARM processors deliver 200 MHz and draw 650 mW at 1.65 V_{dd}. The mid-range chip in Intel's next-generation StrongARM processor lineup will deliver twice the performance with one-third the power consumption, at 45 percent less voltage.

Next-generation StrongARM processors are based on a high-performance, ultra-low power 32-bit RISC architecture implementation and Intel's new 0.18 µ process. These chips will provide a number of significant advantages for developers:

- High processing power—up to 750 MIPS at less than 500 mW.
- Scalable combinations of performance and power consumption—from 150 MHz to 600 MHz at 40 mW to 450 mW.
- Scalable voltage—from 0.75 V_{dd} to 1.3 V_{dd}.
- Compatibility—with current ARM™ architecture.
- In addition, support by a network of third-party vendors providing operating system ports and development tool stacks will enable quicker time-to-market for your products.

Intel's next-generation StrongARM architecture implementation will enable designers to develop a new class of low-power Internet access products that provide greater functionality and richer features while maintaining long battery life. Internet access devices represent just half of the new product story. The high performance and bandwidth of future StrongARM technology will also enable the industry to develop a new generation of cost-effective, high-performance Internet backbone devices, including networking, modem banks, and remote-access servers.

Delivering More MIPS...

Faster Internet connections, voice recognition, real-time video, and larger video displays all demand more processing power than is available from the current generation of 32-bit RISC processors.

Here's just one example. A palm-size device capable of taking dictation requires about 250 MIPS for voice recognition, enough all by itself to push the performance envelope of today's processors. Since it would be impractical for a single function like voice recognition to consume all of a device's available processing capacity, it's clear that more headroom is vital. Next-generation StrongARM processors will deliver up to 750 MIPS, leaving 500 MIPS of processor headroom available for the support of display functions and other value-added features.

Here are some of the ways Intel is building more performance into the next generation of StrongARM processors:

- Next-generation StrongARM technology features the Intel® Super Pipelined RISC Architecture implementation, including a seven-stage integer and eight-stage memory pipeline for dramatically faster processor clock rates.
- Integrated caches have been expanded to further enhance performance. Next-generation processors will include 32 Kbyte 32-way associative instruction and data caches and a 2 K-byte 2-way associative mini-cache. These caches represent significant increases over the current-generation StrongARM architecture implementation.

Among other applications, these performance advances will enable developers to build a whole new class of faster programmable, intelligent Internet access devices capable of simultaneously supporting multiple windows for TV and digital video content.

...With Extremely Low Power

The remarkable thing about next-generation StrongARM processors is that they achieve solid performance gains without tradeoffs in the extremely low-power characteristics for which the StrongARM architecture is noted. Next-generation StrongARM chips feature innovative power-management capabilities:

- New power-management technology includes aggressive voltage scaling and three low-power modes: idle, drowsy, and sleep. The new drowsy mode attains nearly as low a power state as sleep while enabling the instant recall of internal device states for instant-resume capability.
- Clock-gating is extensively used throughout the processor. Clock-gating, also known as demand clocking, clocks off sections of the processor that are not in use, such as between keystrokes during data entry, with instant resumption on-demand.

Intel's Goal: Maintaining "MIPS/milliWatt Leadership"

Intel is making a significant investment in developing its portfolio of StrongARM products with industry-leading MIPS per milliWatt in two ways. It's enhancing products based on the existing SA-1 core, and it's maintaining software compatibility and broad-based tools support in the next generation of extremely lowpower and high-performance StrongARM solutions.

Next-generation StrongARM technology will enable the industry to easily transition to devices that meet the growing demand for a new generation of flexible, high-performance, extremely low-power Internet access and Internet backbone products. It makes Intel's StrongARM processors the right choice for low-power, high performance applications today and tomorrow.

About the Author

Allen Hyman is the marketing manager for Embedded Applications in the StrongARM product line. He is responsible for market development and promotion of StrongARM products and platforms in the embedded market segment.

For More Information

For information on current StrongARM products, including the recently announced SA-1110 and SA-1111 devices, documentation, and product data, visit the [Intel StrongArm Processor Web site](#).

To review the May 4th press release announcing the next-generation StrongARM Architecture implementation visit [Intel's pressroom Web site](#).

Note: ARM and StrongARM are trademarks of Advanced RISC Machines, Ltd. Third-party brands and names are the property of their respective owners.

Hardware Implementation Guide Supports the Easy PC Initiative

By Bala Cadambi
Platform Architect
Intel Desktop Products Group
Intel Corporation

Making PCs easier to use is a vital issue for the industry. Intel's Hardware Implementation Guide contains a wealth of recommendations you can use to provide first-time users with a more rewarding "out of the box" experience.

Intel's new [Hardware Implementation Guide](#) (HWIG) provides developers with a wealth of information that paves the way for PCs that will be easier to use than ever before.

Despite the advances in PC technology over the years, many potential consumers are still intimidated by computers and have chosen to remain on the sidelines of the information revolution. In fact, industry data has revealed that many people don't own or use a PC because they believe that even the newest generation of systems is inherently difficult to set up and use.

To help overcome these issues, Intel and Microsoft have joined together to form the Easy PC Initiative (previously known as the PC Ease of Use Initiative). The initiative's immediate goal is to focus on such advances as the Instantly Available PC (IAPC)/On Now, USB for expansion, broadband connectivity, slim/small PCs based on the FlexATX motherboard, and new features in Windows 98 Second Edition. Looking into the future, the long-term goal of the Easy PC Initiative is to improve the experience of new and existing users and accelerate the delivery of the "Easy PC" platform.

In the consumer market, the Easy PC Initiative is focused on making computers easy to use in ways that assuage the concerns of prospective buyers and turn them into full-fledged PC users. And that's where Intel's Easier to Use Consumer PCs in 1999 Hardware Implementation Guide (HWIG) can help.

Simplifying Complexity

As a guide that covers a number of key subject areas for designing easier-to-use PCs in 1999, HWIG provides significant value to platform developers. Primary HWIG focus areas include information on:

- Delivering Instantly Available functionality that lets users access applications and data quickly
- Eliminating the ISA bus and migrating legacy functions
- Accelerating the transition of PC peripherals from legacy interfaces—such as PS/2, game, serial and parallel ports—to the Universal Serial Bus
- Paving the way for PCs that are smaller, sleeker and quieter than previous systems

To promote the growth of the PC market, it's important that PC manufacturers provide consumers with a satisfying and unintimidating "out of the box" experience. Typical setup times of an hour or more must be significantly reduced, without making assumptions regarding a user's level of knowledge and experience. Because people today want quick and easy Internet access, the setup operation for online services must be viewed as part of the user experience, as with other applications. To that effect, HWIG identifies specific product features that platform developers should consider incorporating into their next-generation products.

Once a PC is set up and configured, it should provide easy and instantaneous access to information, applications and system functionality. The challenge for developers is to make common PC tasks simple, fast and intuitive. With that challenge in mind, HWIG provides specific recommendations for making BIOS functionality and Real Mode environments transparent to users.

Similarly, PCs should make it easy for users to increase performance and expand functionality when adding new hardware, software and networking capabilities. HWIG recommends external peripherals that are designed to use the external plug-and-play capability provided by USB. With the HWIG approach, users should never need to open the system chassis and labor through complex configuration steps, as has traditionally been the case with internal expansion devices.

Availability Is Key

HWIG also includes a wealth of valuable information and recommendations regarding the Instantly Available PC (IAPC). Today's PC owner wants his or her computer to offer a startup experience similar to turning on a television. This change in performance requires a number of changes in design.

First of all, the PC must perform a rapid startup sequence—from both the cold boot and the suspended machine-state—so that overhead in procedures executed by the BIOS and operating system can be eliminated. In addition, the BIOS must implement a silent or quiet boot that suppresses user messages, strings or prompts. IAPCs must also be capable of suspending the machine's state to RAM or disk while providing rapid restoration to operational status. HWIG provides recommendations for solving each of these issues.

HWIG also addresses legacy removal topics, starting with the elimination of ISA slots and related functions. It prescribes the removal of legacy I/O connectors as the industry moves toward the adoption of external plug and play expansion using USB. HWIG discusses how to use the CD ROM drive as the primary recovery device to minimize the need for a floppy drive. Removing internal slots and functions allows much higher integration of core PC functionality in compact packaging based on the new FlexATX motherboard form factor. And the consequent reduction in power and cooling requirements enables designers to reduce acoustic noise—another important consumer requirement for the PC platform.

These and other opportunities to improve the overall PC user experience are covered extensively in HWIG, which today is available at the [Easy PC Initiative Web site](#) as version 1.0. Look for more updates in future issues of Platform Solutions, as Intel continues to work with the industry to advance the frontiers of the Easy PC.

About the Author

Bala Cadambi is a principal platform architect for Intel's Desktop Products Group, where his responsibilities include platform architecture for ease of use, integration of new technologies and form factors.

For More Information

For information on the new Hardware Implementation Guide and related topics, please go to the following URLs:

- [Easy PC Initiative](#)
- [HWIG Rev 1.0](#)
- [Instantly Available PCs/On Now](#)
- [Universal Serial Bus](#)
- [Out of the Box Experience](#)
- [Legacy Removal and Slotless Designs](#)
- [FlexATX Motherboards](#)

DIG64: Accelerating Development of IA-64 Server Solutions

By Michael J. Demshki
Product Marketing Manager, Server Industry Marketing
Enterprise Server Group
Intel Corporation

Industry leaders are working together to specify interfaces between IA-64 based server hardware and system-level software. Their joint effort can help you reduce time-to-market, manage legacy issues and develop highly interoperable IA-64 based server solutions.

Critical concerns such as time-to-market, reliability, legacy management, compatibility, and performance are heightened when industry solutions are to be delivered on a new platform architecture. For the new IA-64 microprocessor architecture, Intel and other leading companies are collaborating to address these and other issues head on. Sponsored by Compaq, Hewlett-Packard, IBM, Intel, NEC and Siemens, the Developer's Interface Guide for IA-64 Servers (DIG64) Industry Working Group is developing an operating-system-independent reference guide that establishes hardware-software compatibility for IA-64-based servers by specifying a common set of system building blocks and interfaces.

This guide, the DIG64, is good news if you're a hardware manufacturer, software developer or other developer of IA-64-based products and solutions. It can help you:

- Get your IA-64-based products to market more quickly.
- Optimize your product development resources, reduce design rework and lower development costs.
- Increase your customers' confidence that your IA-64-based server solutions will integrate and interoperate compatibly with those of other vendors.
- Transition smoothly to the high performance and scalability of the Intel® Merced™ processor and the IA-64 architecture.

Problems with the Traditional Approach to Developing the Solution Stack

The Intel Merced processor and the IA-64 architecture will enable breakthrough levels of performance, scalability, and cost-effectiveness in the midrange and high-end server market segments. IA-64 will also open additional market segments to vendors of Intel-based server systems and peripherals, and provide an affordable, high-powered platform on which companies can run mission-critical business applications.

As with any new processor architecture, comprehensive answers to customers' computing needs have to wait until the underlying solution stack—processors and chipsets, platforms, operating systems, device drivers and other system software, and finally applications—is in place.

Traditionally, developing the server solution stack is a serial process, where each layer must be designed and prototyped sequentially (Figure 1). Because it's a sequential process, it's inevitably slow.

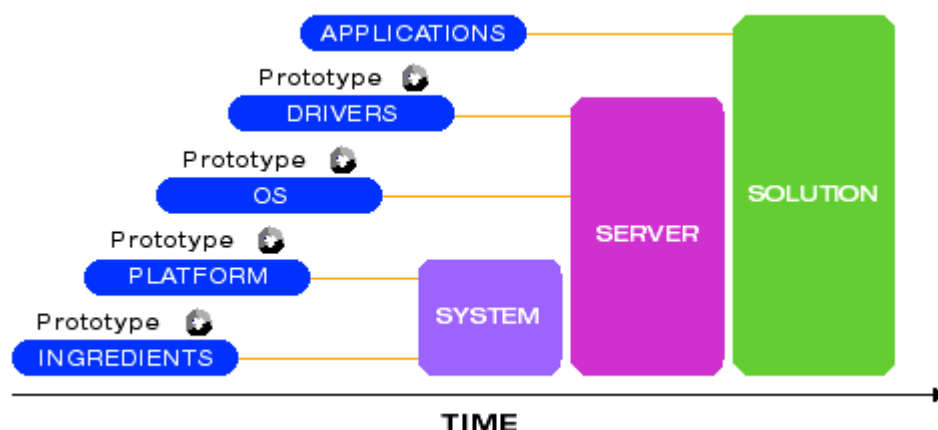


Figure 1. Traditional, sequential development of the solution stack.

What's more, to ensure compatibility and interoperability between layers, vendors must make numerous design decisions about which of many possible interfaces to support. In the 32-bit world, a large installed base has resolved such issues by establishing a de facto baseline system. With a new processor architecture, however, the status quo hasn't been established yet.

Without widespread agreement on the interfaces between the server and system software layers, vendors must choose from among many possible approaches and interfaces. They have to resolve compatibility issues through repetitive design iterations with many other vendors.

This process is not only slow, it's inefficient and error-prone. It delays getting solutions into customers' hands, drives up development costs, and increases the likelihood of compatibility and support problems.

Getting Products to Market Faster

One way to accelerate development of solution stacks is to develop multiple levels of the stack concurrently. To do this, the compatibility between the layers must be clearly defined prior to development. The DIG64 enables this type of accelerated development by clearly defining compatibility between the hardware and system software levels of the stack.

Instead of serial development of the solution stack and repetitive prototyping, DIG64 enables concurrent development by defining compatible interfaces (Figure 2).

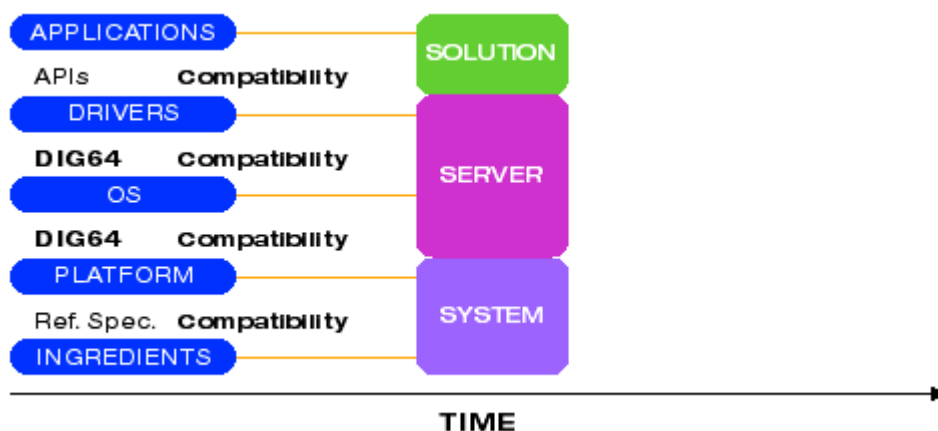


Figure 2. With DIG64: concurrent (and faster) development.

The DIG64 specification will define basic system building blocks, required and optional interfaces, and programming conventions between IA-64-based servers and system-level software such as the operating system and device drivers. As Figure 3 shows, the DIG64 specification takes a broad look at all pertinent subsystems from processor and firmware to storage and management. Within each subsystem, the DIG64 interfaces include only a small, select subset of those already defined in the multitude of existing industry specifications. Therefore, in developing the guide, the participants are not creating new standards and interfaces, but rather choosing from the best available to set requirements and options.

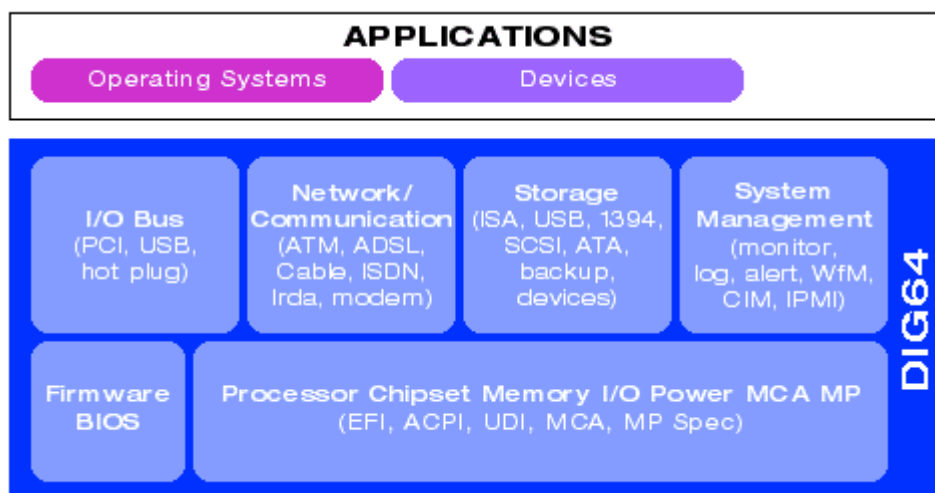


Figure 3. Scope of DIG64 specification.

The process of developing the DIG64 will promote industry consensus and save countless hours of one-on-one design and coordination effort. The DIG64 will also help enable system and software development to proceed concurrently with processor development, and accelerate the availability of robust, IA-64-based server solutions. The DIG64 is a win for customers too: it should enable IT departments to deploy IA-64-based servers and software with confidence, knowing that system elements, interfaces, and products are designed from the outset to fit together and operate reliably.

A Forum for Technology Transition

The DIG64 Industry Working Group provides an industry forum in which to take a rational approach to questions about support for older, legacy technologies that have been made obsolete by new ones. These legacy technologies—from obsolete bus architectures to outdated boot procedures—impose a burden on system and OS designers and IT departments alike. They can raise system and support costs, and inhibit design flexibility without adding value to the end user.

In the DIG64 Industry Working Group, industry representatives can work cooperatively to reexamine and update legacy technologies. The DIG64 specification will embody the results of this effort. By providing a forum for addressing legacy issues proactively, the DIG64 Industry Working Group will help ensure that IA-64-based system designs and decisions are well thought out. In addition, by removing unneeded legacy technologies, the DIG64 will help foster innovation and flexible designs and reduce the costs of supporting outdated technologies.

Developing the DIG

The DIG64 Industry Working Group is a broad-based group of 20 companies that includes server hardware manufacturers, operating system vendors, BIOS vendors, application software vendors, and peripheral hardware manufacturers. Initial results from the DIG64 Industry Working Group are expected in Q4 1999, to support early product availability in mid-2000 and volume products in the second half of the year.

For More Information

Knowledge of the core IA-64 building blocks and interfaces is critical to developing comprehensive, high-quality solutions, and it's available through the DIG64 guide. The DIG64 guide is currently under development, but you can stay informed of progress and the DIG64 Industry Working Group's activities by watching the [Developer's Guides Web site](#). Also, look to this same site to find out how you can get a look at early drafts of the DIG64 guide by becoming an early adopter member.

About the Author

Michael Demshki is product marketing manager for Intel's Server Industry Marketing. In his current position, he is responsible for developing and managing server industry efforts for Intel and for coordinating the marketing of these efforts across Intel divisions. Previously, he was product line manager in Intel's System Management Division. He worked in the high-end server market segment for over 8 years prior to joining Intel and has held various positions in engineering, marketing and management over the last 17 years. Michael Demshki completed high-tech management post-graduate work at Stanford University in 1994, received an M.S. in Software Engineering in 1982 from Wang Institute of Graduate Studies, and a B.S. in 1979 from Colorado State University.

UDIG: Increasing Consistency for UNIX* on IA Servers

By Ramin Neshati
Technical Program Manager, Developer Guides
Enterprise Server Group
Intel Corporation

Learn how you and your customers can benefit from the broad-based industry initiative that specifies a common set of hardware interfaces for UNIX operating environments on IA servers.

With its proven robustness, reliability, scalability, security, and performance, UNIX has long been an operating system of choice for engineering workstations and mission-critical, multi-user server systems. Most servers that drive the Internet today are powered by various flavors of UNIX, including those from IBM (AIX*), Hewlett-Packard (HP-UX*), SCO (UnixWare*), Sun (Solaris*) and other vendors. The open source Linux operating system—yet another UNIX variant—has found worldwide acceptability among IT professionals, as well as a dedicated core of developers and promoters among the software engineering community. Compaq, IBM, Hewlett-Packard, Dell, and other server manufacturers have announced support for Linux, and Linux distribution companies such as Red Hat and VA Research are growing rapidly to keep pace with the intense interest.

But there's a downside to UNIX too: the great number of UNIX variants create interoperability problems for customers and cause headaches for developers. UNIX hasn't been able to garner the attention of independent software application developers and the burgeoning ISV community. Software engineers have to be careful when using certain UNIX system capabilities, since they may not be available on all UNIX variants. Customers may experience interoperability problems and incur higher validation expenses. Product cost also affects the competitiveness of UNIX solutions. Both Microsoft and Novell provide less expensive solutions for low- to mid-range servers and are aiming to enter the high-end of the market segment; past attempts at unifying UNIX to counter this encroachment have not proven successful. Compared to Microsoft or Novell offerings, UNIX also lacks a standard, consistent, easy-to-use set of systems management tools and applications.

These concerns, already significant in the traditional UNIX arena of proprietary server platforms, are amplified when the universe of systems expands to include multiple UNIX environments on Intel-based servers. To address these issues—and to help ensure a wealth of low cost, high-performance, interoperable, and competitive server products based on the Intel® Architecture—the Server Industry Marketing Group at Intel's Enterprise Server Group has sponsored an industry initiative and a task force called the UNIX Developer's Interface Guide (UDIG) and the UDIG Working Group, respectively. What is the UDIG and how will it benefit you and your customers?

About the UDIG

Far from being another attempt at unifying UNIX, the UDIG is the result of an industry-wide effort to define and establish common, compatible building blocks and interfaces that encompass the operating system, system firmware, and add-on devices that comprise the components used in servers based on the Intel architecture. The primary audience of the UDIG is hardware, firmware, and software engineers who design and test the interfaces for these server components and building blocks.

Contributing members of the UDIG Working Group include OS vendors IBM, SCO, Compaq, HP and Sun; firmware vendor Phoenix; and hardware adapter vendors LSI Logic, Adaptec, 3Com, and Intel. Figure 1 shows the UDIG relationship to other industry specifications and guides.

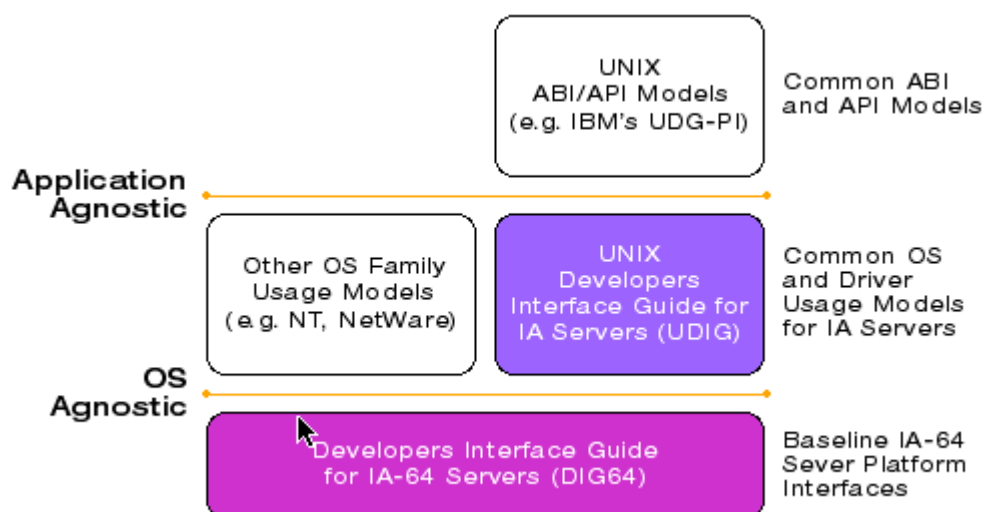


Figure 1

The UDIG and the DIG64

The UDIG guidelines and interfaces depend on a companion effort for establishing common server components based on the forthcoming Intel® IA-64 technology—the Developer's Interface Guide for IA-64 Servers (DIG64). The DIG64 focuses on hardware and firmware interfaces and is "OS-neutral," while the UDIG describes design guidelines for interfacing UNIX to IA-based server platforms. As such, the UDIG is "UNIX-neutral" and encompasses both IA-32 and IA-64 systems, with greater consideration given to 64-bit platform concerns and design criteria.

The UDIG Working Group intends to publish the first release of its specification, targeted at system designers, later this year and to provide tools and other enablers to facilitate industry adoption of the specification by early in the year 2000. UDIG 1.0 will contain design guidelines covering the areas depicted in Figure 2.

UDIG Topics

Device Drivers	<ul style="list-style-type: none"> IA instruction set and calling conventions UDI implementation guidelines Linux reference implementation (SCSI) Testing and tools Legacy cleanup USB I₂O
Boot and Configuration	<ul style="list-style-type: none"> Common boot interfaces for all UNIX flavors Common interfaces with Option ROMs Boot from LAN Device discovery, enumeration, configuration Hot swap, dynamic configuration ACPI EFI, BIOS run-time services Topology determination USB
Technology Migration	<ul style="list-style-type: none"> Legacy removal Abstractions
Performance	Clustering
RAS Support	Hot Swap: CPU, Memory, I/O, etc.

Figure 2

The initial UDIG release is expected to consider guidelines for:

- The pre-OS environment (boot, configuration, run-time firmware support, and others)
- Device drivers (usage guidelines for UDI-based drivers, etc.)
- Technology migration (interfaces to remove or transition away from obsolete technologies)

In the future, the Working Group may take up performance, RAS, security, server management, and other areas of mutual interest to the member companies.

UDIG Benefits

By establishing common hardware interfaces across various flavors of UNIX and devices used with Intel-based servers, the UDIG aims to simplify the development process for operating system vendors (OSVs) and independent hardware vendors (IHVs). OSVs can reduce the time needed to port their version of UNIX to different platforms and customize it for each platform. IHVs can reduce the time and engineering resources devoted to supporting different vendors' UNIX implementations. Instead of reinventing the wheel for multiple flavors of UNIX, vendors can focus their design resources on areas that deliver real business value to customers and can help distinguish their products in the marketplace. By adhering to the UDIG guidelines, both groups can more readily develop products that contribute to overall system performance, scalability and robustness, and that reduce the costs of development, validation, and testing.

Having an open industry specification should promote the development of peripherals for IA-based UNIX implementations and ensure OEMs (and customers) of a broader range of peripherals available for their systems. Along with finding a wider range of OS and peripherals choices, OEMs and IT departments should also find it simpler to validate and qualify new devices for the IA servers. Businesses that specify UDIG-conforming servers can increase the interoperability of their IT infrastructure and choose the operating system that best meets their needs while maintaining a common computing foundation based on the Intel architecture.

About the Author

Ramin Neshati joined Intel in January 1998. Before becoming the Developer Guides Technical Program Manager, he represented Enterprise Server Group on the Wired for Management initiative. Aside from Intel, Ramin has over 15 years of industry experience at S3 Incorporated, Dell Computer Corporation, Xerox Corporation and Link Systems Incorporated, in a variety of positions from software engineering, architecture and engineering management. Ramin holds three degrees: MBA from Pepperdine University (1993), MSCS from the University of Idaho (1982) and BSCS from Washington State University (1980). He has collaborated on several patent applications, published articles on networking protocols and services, and lectured at computer user's groups symposia, including EDGE and DECUS.

For More Information

For information about the progress of the UDIG Working Group, visit the [Industry Developer's Guides Web site](#). The initial UDIG specification is expected to become available to the industry for review and comment around September 1999, along with industry enabling tools, SDKs and marketing collateral. Following a two-month public review period that's expected to begin around the time of the Intel Developer Forum (IDF) later this year, the UDIG 1.0 will be published and made available to the industry. Tools and other test and compliance enablers will also be made available to the industry. Intel will sponsor "plug-fests" and other open testing forums for ensuring interoperability between products from participating companies. OSVs and IHVs can administer and monitor their own compliance testing processes.

Intel Developer Forum Is a Hit in Taiwan and China

By Stanley Huang
Director of Product Marketing and Business Management
Intel Asia-Pacific

Key developers in the Asia-Pacific region supply vital building blocks for the entire PC industry. The Intel Developer Forums in Taiwan and China were rousing successes, with 750 attendees in Taipei and 800 attendees in Beijing.

Intel recognizes that the Asia-Pacific region has become the worldwide PC design and manufacturing center, so it was logical for Intel to bring its Intel Developer Forum to the APAC region for the first time in late April. The inaugural Intel Developer Forums in Taiwan (April 26-28) and China (April 29-30) were rousing successes, with 750 attendees in Taipei and 800 attendees in Beijing, respectively, and Intel is more than pleased with the level of developer participation at the events.

By hosting the Intel Developer Forum in the Asia-Pacific region, Intel had the opportunity to discuss new standards and initiatives with key APAC developers who serve as the building block suppliers for the entire PC industry. The forums also offered attendees a venue to provide feedback and offer suggestions on potential roadblocks that may affect them. The opportunity to meet and discuss these new standards and initiatives was invaluable, especially since about 50 percent of all the building blocks in the PC industry are currently supplied by the Asia-Pacific region.

Both APAC IDF events were similar in format to the semi-annual Intel Developer Forums hosted in the United States, featuring executive keynote addresses and multiple technical tracks. The keynotes in Taiwan were highlighted by Craig Barrett, Intel's president and chief executive officer, addressing more than 500 APAC company leaders at a special industry dinner. Eight other keynotes in Taiwan included Intel vice presidents Pat Gelsinger, Robert Jecmen, John Miner, Avtar Saini, and Ron Smith, while Miner and Smith also gave keynotes in Beijing. Additionally, more than 70 hours of technical track topics in Taiwan ranged from desktop platforms and mobile systems to server/workstation systems and embedded application. In Beijing, where keynotes and tracks were simultaneously translated from English to Chinese, the tracks included speech, security, and the Internet.

Just as the Intel Developer Forum in the United States has become renowned for industry press announcements, workshops, and seminars, the APAC forums enjoyed their share of media attention and industry activities.

Press conferences for Intel products at both events included the launches of the Intel® Celeron™ processor at 466 MHz and the Intel® 810 Chipset for Value PC platforms, as well as the introduction of the Intel® 752 Graphics Accelerator for mainstream PCs. These three products were actually introduced to the world for the first time at "3-in-1" product launch press conferences in both Taiwan and Beijing, highlighted by a presentation by Smith, who operates Intel's Computing Enhancement Group that oversees Intel's chipset and graphics business. And because these products were launched in APAC, regional OEMs were able to simultaneously announce their systems using these products as well as display them at the launch press conference in Taipei.

Also in Taipei, Barrett hosted an IDF roundtable press conference with Gelsinger, Jecmen, Miner, and Smith in which the Intel executives answered a variety of questions on the PC platform future. Media coverage of the forums has been extensive and overwhelmingly positive, as many of the top broadcast, business, and trade media in the region were in attendance.

Industry activities at the forums were highlighted by Intel and third-party technology showcases in Taipei, roundtable discussions with software company executives in Taipei and Beijing, an ACPI Plugfest in Taipei, and extensive customer meetings at both forums. In short, IDF is the ideal venue for the industry to meet and discuss technology directions, standards, and issues that confront us all.

Of course, with such a positive response from the more than 2,000 developers who attended the Taipei and Beijing forums, Intel is again working to bring IDF to the Asia-Pacific region in the fall of 1999. Judging from the responses of IDF attendees, Intel has established new quality standards for industry events with the Asia-Pacific Intel Developer Forums. Combine the region's strong response to the forums with Intel's recognition that APAC is becoming increasingly important to Intel® Architecture-based products, and plans are already under way to make the fall 1999 forums in APAC a success. We thank all of you who were involved in the Taipei and Beijing events, and we look forward to working with you on future forums as the Asia-Pacific region continues to supply the building blocks to the entire PC industry.

About the Author

Mr. Stanley Huang is the director of marketing and business operations for Intel's Asia-Pacific Operation. Mr. Huang joined Intel in 1990 as the regional marketing manager for Asia-Pacific Region, transferred to Taiwan country manager position since Jan. 1995, and promoted to the current director of marketing and business operations in December 1996. Prior to joining Intel, he worked at Control Data Corporation as director of technical services in charge of all technical services/support.

Mr. Huang graduated from Taipei Institute of Technology with major in Mechanical Engineering and also received Master of Science Degree from the State University of New York at Buffalo, and completed doctoral course work at State University of New York at Buffalo. He also completed the Stanford University Executive Management program and Marketing strategies program from Berkeley University.

Technology News Bytes

May 17

[Intel Introduces 550 MHz Pentium® III Processor for the Desktop: Fastest Intel Processor Design for the Internet](#)

[Intel Introduces New Products for Value Notebook Computers that Deliver More Performance and Lower Overall System Cost](#)

May 13

[Intel Supports Epigram's 10 Mbps Home Networking Technology](#)

Intel announced it will support Epigram Inc.'s 10 Mbps (Megabits per second) technology for second generation home phoneline networking products. Epigram's InsideLine™ technology has been submitted to the Home Phoneline Networking Alliance (HomePNA), which has announced plans to finalize a 10 Mbps specification, called HomePNA 2.0, in the second half of 1999. In addition, Intel and Epigram will cross license key home networking technologies.

May 12

[Intel® SE440BX-2 Motherboard Product Awarded "CRN Choice" by Computer Reseller News UK](#)

Saying the product's features and extras indicate that Intel understands reseller needs, the UK edition of Computer Reseller News has designated the Intel SE440BX-2 motherboard a CRN Choice. The assessment calls special attention to the product's advanced BIOS, which auto-detects processor speed, and its sophisticated configuration design, which reduces settings to a single jumper.

May 10

[Technology Leaders and Corporate Users Form Quarter Billion Dollar Investment Fund Targeting Intel's IA-64 Architecture](#)

Intel announced the formation of the Intel 64 Fund, LLC, an equity investment fund of approximately \$250 million available for investing in technology developing tools and technologies for Internet, enterprise, and workstation applications. The fund, which includes investments from a unique group of leading technology companies as well as large corporate users, will target solutions for Intel's IA-64 architecture, beginning with the processor code-named Merced™.

May 5

[RealNetworks Teams with Intel to Deliver First Streaming 3D Solution for Fonts & Effects: Intel Software Allows Developers to Incorporate Streaming 3-D Text and Effects into RealPlayer G2 Multimedia](#)

At the RealNetworks Conference & Exhibition '99 RealNetworks®, Inc. and Intel announced they have teamed to deliver RealText® 3D, a low-bandwidth, client-based solution for creating 3-D text with animation and visual effects such as twists, melts, fades and wipes. RealNetworks has licensed the Web Design Effects (WDE) Software developed in the Internet Media Initiative of Intel Architecture Labs (IAL), and will offer it as a plug-in to RealPlayer G2.

May 3

[Next Generation Intel® StrongARM® Technology to Deliver 600 MHz at Less than Half a Watt: Groundbreaking Design Enables Development of Advanced Handheld, Internet Access and Internet Backbone Devices](#)

Intel disclosed details of its next-generation StrongARM® technology, designed to accelerate the development of advanced handheld computing products, enable new classes of low-power, high-performance Internet access devices, and enhance Internet backbone products.

Intel Announces New Stacked Chip Scale Package to Support Smaller, Lighter Wireless Devices

Intel Corporation today announced a new stacked chip scale package (CSP), which vertically mounts flash memory and SRAM onto a single package. Intel® Stacked-CSP, combined with Intel® Flash Data Integrator (FDI) software (which integrates the functions of EEPROM), integrates the functionality of flash memory, EEPROM, and SRAM. This saves cost, weight, and board space critical to the highly competitive wireless market.

Forbes Magazine Spotlights Intel Architecture Labs Research

Forbes Magazine features IAL Lab Managers Carmen Edigo and Abel Weinrib, a wife-and-husband team, for "Putting Research to Work." The May 3 article covers IAL research on Intel® Policy-based Network Management ([PBNM](#)) technology, exploratory research on hand-held information pads and work with Mattel to produce [Intel® Play™](#) PC-enhanced toys.

May 2

Instantly Available PC (IAPC) Showcased

The Intel Desktop Products Group hosted a booth showcasing recent advances in IAPC technology at the first-ever National Town Meeting for a Sustainable America, held in Detroit May 2 - 5. The Detroit meeting and more than 100 affiliated meetings in more than 30 cities were billed as groundbreaking events focusing on the quality-of-life issues Americans care about today. IAPC design guidelines, developed in the IAL Scalable Platforms initiative, help create computers that "sleep" when not in use and quickly "wake up" in response to direct user commands, programmed back up procedures, telephone calls or network alerts. The Environmental Protection Agency (EPA) predicts that over the next 10 years IAPC technology could save an amount of energy equivalent to removing 60 million cars from U.S. roads for one year.

April 30

Intel, Motorola Settle Trade Secrets Suit

Intel Motorola, Inc. announced an agreement to settle a pending trade secrets lawsuit. Specific terms of the agreement were not disclosed. Both parties said they are satisfied with the settlement. Dismissal of pending litigation is expected within two weeks.

April 28

Intel and Proxim to Further Wireless Home Networking

Intel and Proxim, Inc. announced that the two companies have completed a technology agreement and an Intel equity investment in Proxim. Proxim, a leading supplier of wireless LAN products, and Intel are currently working together to develop wireless home networking products based on the HomeRF SWAP (Shared Wireless Access Protocol) specification. The SWAP specification provides a standards-based solution designed to enable a broad range of interoperable consumer devices to use wireless data and voice communications in and around the home. Intel's HNO group and Connected.Home Initiative in IAL are developing products and technologies to support this focus.

Intel Introduces Server Board to Help Fulfill the Internet Needs of Small and Medium Businesses: C440GX+ Server Board supports Two Pentium® III Xeon™ Processors for Improved Performance

Intel introduced the Intel® C440GX+ server board and the Cabrillo-C server chassis, two new server building blocks designed to be easily integrated with two Pentium® III Xeon™ processors so that resellers and integrators can build cost-effective, high-performance servers. The 440GX+ features dual peer PCI buses that provide three times the PCI bandwidth of most other dual processor boards, which results in faster performance for businesses that use the Internet.

April 27

[Intel and Level One Merger Receives Clearance from Federal Antitrust Agencies](#)

Level One Communications and Intel announced that the 30-day waiting period for antitrust review of the proposed merger of the companies has expired without any request for additional information being issued. As a result of the expiration the parties have clearance from both federal antitrust agencies to consummate the merger. Level One Communications, a leader in communications IC technology, provides silicon connectivity solutions for high-speed telecom and networking applications.

[Intel Previews Plans for New ISP Channel Program at ISPCON Spring '99](#)

Intel is developing a new worldwide channel program dedicated to the growing product and service needs of regional and local Internet Service Providers (ISPs). The new Intel Internet Service Provider Program will provide ISPs, as well as value-added resellers (VARs) that serve ISPs, with a focused line of local and wide area network (LAN/WAN) connectivity products and recipes for server solutions. Intel senior vice president Sean Maloney previewed program at ISPCON Spring '99, where he kicked off the show with a keynote speech describing Intel's role as a building-block supplier to the new Internet economy.

[Intel Introduces Intel® 752 Graphics Accelerator Chip, the Complete Multimedia Solution for Mainstream PCs](#)

Intel announced the Intel® 752 graphics accelerator chip, a complete multimedia solution for Intel® Pentium® III processor-based platforms that delivers enriched visual quality for consumer and business software applications. Featuring Intel® Scalable Graphics Architecture, the Intel 752 graphics accelerator brings high-quality 2-D graphics, enthusiast-level 3-D rendering and advanced digital video acceleration to mainstream PCs.

April 26

[Intel® 810 Chipset Integrates 3-D Graphics, Enables Software-Based Audio, Modem and DVD](#)

Intel introduced the Intel® 810 chipset, built on the strong foundation of Intel® 440BX AGPset technology. The Intel® 810 chipset has re-engineered the Value PC, providing next generation features and great graphics performance at a lower cost.

[The Celeron™ Processor 466 MHz Is Now Intel's Fastest Processor for Value PCs](#)

Intel introduced the Celeron™ processor 466 MHz, providing great performance for today's applications and a great way for consumers to get on the Internet for under \$1,000.

April 23

[Computer Reseller News CRN Test Center Gives Intel® SE440BX-2 Motherboard an "A" Rating](#)

"The Intel® SE440BX-2 motherboard bundle contains unique features targeted at resellers," according to findings from the CRN Test Center. The leading industry publication awarded the product an overall A, a rating that included two A+ ratings for performance.

March 15

[IPEAK GPT Selected as Finalist for Frontline Award](#)

The IPEAK Graphics Performance Tool (GPT) 2.0 was a finalist for Game Developer Magazine's Frontline Award. This award recognizes new tools that let game developers create exciting and complex computer games. IPEAK GPT 2.0 was developed in Intel Architecture Labs' (IAL) Scalable Platforms Initiative. IPEAK GPT 2.0 enables game developers, hardware developers' and OEMs to boost their system graphics. 3D software developers utilize GPT to tune the performance of their games, and graphic controller vendors use GPT to match 3D applications to their graphic chips.

Industry Events

June Events

- Intel Web Developer Technology Seminar
- Computex '99
- SIA (Securities Industry Association)
- DAC (Design Automation Conference)
- PCEXPO 99
- System Test Implementers Forum Planning Session

July Events

- Inprise and Borland Conference
- CA-World 1999
- Informix Worldwide User Conference (IWUC)

August Events

- SIGGRAPH
- Hot Chips Conference
- Seybold San Francisco 21st Century Publishing
- Intel Developer Forum (IDF)

Industry Events in June

Computex '99

June 1-4

Taipei, Taiwan

At this show for resellers and system integrators, look for Intel to demonstrate graphics and chipsets, including the new Intel® 810 chipset.

Intel Web Developer Technology Seminar

June 3

55 Broad Street

New York, NY

See and hear about the latest tools and technologies from key developers such as Shells Interactive, Beatnik, Live Picture, IPIX, MetaCreations, and Real Networks. All these rich media types can help you enhance web sites, provide users with a better Internet experience and position you on the technology edge.

SIA (Securities Industry Association)

June 15-17

New York Hilton Hotel

New York, NY

This is the annual management education program designed expressly for individuals within securities firms who have management responsibility for technology-based support activities, including telecommunications, market data, trading systems, processing, and information systems. The three general sessions, 20 workshops, luncheon meeting, and Exhibit are all aimed at helping the target audience become more effective. The Conference program is developed under the guidance of the sponsoring Technology Management Committee.

DAC (Design Automation Conference)

June 21-25

New Orleans, LA

With the theme of Designing Systems for the New Millennium, the Design Automation Conference (DAC) bills itself as the premier Electronic Design Automation (EDA) and Silicon solution event. The 36th Design Automation Conference is sponsored by the ACM/SIGDA (Association for Computing Machinery/Special Interest Group on Design Automation), IEEE/CAS (Institute of Electrical and

Electronics Engineers/Circuits and Systems Society), and EDAC (Electronic Design Automation Consortium). DAC features an outstanding technical conference with over 50 sessions led by leading system designers and researchers presenting the latest in design methodologies and EDA tool developments along with industry trends and information. The DAC Exhibition and Demo Suite area features over 230 of the leading EDA, silicon, and IP providers.

PCEXPO 99

June 22-24

Javits Convention Center
New York, NY

With the theme Technology for Business, PCEXPO claims it's not just an event—it's *the* event for business technology, the most influential corporate computing event in the country. From Windows NT to NetWare, client/server to Java, PCEXPO showcases the latest technology for business not just on the desktop but also throughout the enterprise. Intel will have a large presence at PCEXPO. Demonstrations will include the Intel 810 chipset, mobile processors, and wireless technology.

System Test Implementers Forum Planning Session

June 24-25

San Diego, CA

All System Test-IF members are invited to a Futures Planning Session to help refine long-range plans for the System Test-IF. Hear tutorials and experience a hands-on PC 99 H/W compliance and WHQL test lab. Openly critique the draft 1.3 PC 99 H/W Test Specification. Help steer the industry and make yourself heard about needs and hot topics in support of system testing in the 2001 time-frame.

Industry Events in July

Inprise and Borland Conference

July 17-21

Philadelphia, PA

The 10th Annual Inprise and borland.com Conference is for independent developers building custom solutions, tools, and components, for IT managers, and for developers creating large enterprise applications. This conference gives you the chance to meet with and learn from the brightest minds in the industry by designing your own curriculum from more than 200 sessions led by industry experts. You can mix and match sessions to focus on your specific needs. You'll discover hundreds of the latest developer and management tips and techniques. Learn how to exploit new technologies and manage projects on Internet time.

CA-World 1999

July 18-23

New Orleans, LA

Computer Associates International, Inc. presents CA-World 1999 as the premier user education technology conference and exposition in the IT industry. It offers over 3,000 technical sessions and hands on labs plus a free PreConference Education series. Topics covered will be applications and database development, systems and network administration, Year 2000 conversion, object oriented database management, security, and Internet/Intranet technologies. Intel will have a booth at CA World and will be demonstrating managed platforms and Wired for Management technologies. Intel president Craig Barrett and chairman of the board Andy Grove will be keynote speakers.

Informix Worldwide User Conference (IWUC)

July 19-22

San Diego, Convention Center

San Diego, CA

IWUC '99 is the place to learn and share with other technology-savvy IT leaders about database powered solutions for OLTP, e-commerce and data warehousing. Join over 3,000 business and technology professionals from industries including telecommunications, retail, financial services, healthcare, broadcast and publishing markets in the interactive forum of leading global companies and people.

Industry Events in August

SIGGRAPH

August 8-13, 1999

Los Angeles Convention Center

Los Angeles, CA

ACM's annual gathering for its Special Interest Group on Graphics has become the world's epicenter of computer graphics and interactive technologies, with hundreds of companies offering thousands of products and services for the new century. SIGGRAPH offers developers the opportunity to see, explore, and interact with essential tools and techniques produced by today's world trendsetters and tomorrow's upstart innovators. Intel will have a major presence at this year's conference, with special demonstrations of its workstation, server, and graphics products and technologies.

Seybold San Francisco 21st Century Publishing

August 30- September 3

San Francisco, CA

Each day of SSF has something to help you do your job better, make more money, or understand how your business environment is going to change. The focus will be on the open exploration of the key issues and the introduction of new concepts and technologies for the electronic publishing process, with clues to the direction the industry will be taking. Tracks includes: the state of Internet design and technology, optimal server architecture, connectivity, mixed-platform environments, and digital imaging.

Intel Developer Forum (IDF)

August 31-September 2

Palm Springs Convention Center

Palm Springs, CA

Three full of in-depth presentations, demonstrations and dialogue with Intel's chief technology architects, plus third party luminaries will give you a head start for designing platform for the new millennium. The Intel Developer Forum covers today's implementation details and tomorrow's technology roadmaps to keep you up-to-date on the latest desktop, workstation, server, and mobile platforms and embedded technologies including:

- IA-64—emerging Internet server technology
- Enabling trusted Internet access and e-commerce—year 2000 security roadmap
- Intranet/enterprise clients and servers
- Software tools—for authoring rich Internet content and applications
- Easy-to-use PCs and home networking—bringing Internet access to every room in the home
- Next-generation StrongARM® solutions—Internet applications and digital companions
- Improving and extending Internet connectivity—broadband, wireless
- USB 2.0—higher bandwidth connectivity for PC peripherals

Keynotes will be delivered by Intel's top executives and will provide perspectives on how these technologies are shaping the PC Industry.

More information will be posted on the IDF Web site in early June.

—End of Platform Solutions Issue 20—